Supplementary Online Content


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This supplementary material has been provided by the authors to give readers additional information about their work.
eFigure 1. Catheter-Associated Urinary Tract Infection (UTI) Bundle Infographic. AHRQ indicates Agency for Healthcare Research and Quality; HAIs, healthcare–associated infections.
eFigure 2. Project Timeline for Cohorts 1–4

Monthly Outcomes Data collection start: Cohort 1-May 2014; Cohort 2- November 2014; Cohort 3- June 2015; Cohort 4: September 2015. Cohort 4 had compressed data collection schedule of 10 months.
eAppendix 1. List of Educational Presentation Topics

1. Onboarding Modules
   i. Building Your Team to Enhance Resident Safety
   ii. Catheter-Associated Urinary Tract Infection (CAUTI) Definitions and Reporting
   iii. Data Collection, Submission, and the AHRQ Nursing Home Survey on Patient Safety Culture

2. Training Modules
   i. Exploring Hand Hygiene: Knowledge and Practice
   ii. Clean Equipment & Environment: Knowledge and Practice
   iii. Personal Protective Equipment and Standard and Transmission-based Precautions
   iv. How to Avoid the Harms of Antibiotic Overuse

3. Monthly National Content Webinars
   i. Urinary Catheter Types and How to Care for Them
   ii. Training LTC Facility Staff on Catheter Insertion and Maintenance to Prevent CAUTIs
   iii. Catheter Care and Maintenance
   iv. Hydration Practices and Urinary Incontinence Care Planning
   v. Antibiotic Stewardship
   vi. The Culture of Culturing: The Importance of Knowing When to Order Urine Cultures
   vii. Demystifying CAUTI: When to Culture and When to Treat
   viii. Leave Well Enough Alone: Avoiding Unnecessary Urine Cultures
   ix. The Importance of Assessment to Prevent Resident Harm
   x. A Farewell to Harms: Turbocharged Walking Rounds
   xi. Applying NHSN CAUTI Criteria to Case Studies
   xii. NHSN CAUTI Case Studies: Focusing on Changes in Mental Status and Activities of Daily Living (ADLs)
   xiii. Long-Term Care Safety Toolkit: Building a Culture of Safety
   xiv. Communicating Changes in Resident Condition
   xv. Engaging Residents & Families in HAIs/CAUTI Prevention
   xvi. Resident and Family-Centered Services: Maximizing Your Team
   xvii. Interpreting and Using Your Results from the Nursing Home Survey on Patient Safety Culture
   xviii. Care Transitions and Handovers: How Hospital and LTC Staff Can Partner with Patients and Residents to Reduce CAUTI Together
   xix. Identifying and Overcoming Barriers to Staff Engagement in the CAUTI LTC Program
   xx. Overcoming Challenges to Reduce CAUTI and Improve Safety Culture
   xxi. Communication Strategies to Promote Resident Safety
   xxii. Viewing HAI Prevention through the Lens of Quality Assurance and Performance Improvement (QAPI)
   xxiii. Using the CDC's National Healthcare Safety Network (NHSN) to Collect Data and Sustain Your Gains
The final versions of an extensive set of CAUTI prevention resources that were developed and applied in the AHRQ Safety Program for Long-term Care: HAIs/CAUTI project are available on the Agency for Healthcare Research & Quality (AHRQ) website (http://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/cauti-ltc/index.html).

How to Use This Toolkit


The toolkit is organized into three main sections that your facility can use to implement an improvement project to reduce CAUTI and other HAIs. Each section contains guides, tools, slide sets and videos to support implementation. All materials are publicly available and downloadable online. Many can be modified to meet the local facility needs and criteria.

Toolkit Sections

Each section contains customizable resources that your facility can use to implement an improvement project to reduce CAUTI and other HAIs.

A. Implementation


B. Sustainability


C. Resources


1. A Unit Guide to Infection Prevention for Long-term Care Personnel (PDF File):
   This guide provides frontline and other staff with basic knowledge about LTC facility infection prevention guidelines
2. Tools are available in the following topic areas:
   - Implement an Infection Prevention Quality Improvement Project
   - Improve Safety Culture
   - Engage Residents and Families
   - Practice General Infection Prevention Skills
   - Prevent Catheter-Associated Urinary Tract Infection
   - Catheter-Associated Urinary Tract Infection Surveillance
   - Reduce Unnecessary Urine Culturing and the Overuse of Antibiotics
## eTable 1. Catheter-Associated UTI Rates and Catheter Utilization by Project Month

<table>
<thead>
<tr>
<th>Study Month</th>
<th>Nursing Home (no.)&lt;sup&gt;a&lt;/sup&gt;</th>
<th>CAUTI&lt;sup&gt;b&lt;/sup&gt; (no.)</th>
<th>Resident-days</th>
<th>Catheter-days</th>
<th>CAUTI rate&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Catheter utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>361</td>
<td>333</td>
<td>1088405</td>
<td>49140</td>
<td>6.777</td>
<td>4.5%</td>
</tr>
<tr>
<td>4</td>
<td>368</td>
<td>366</td>
<td>1133680</td>
<td>52062</td>
<td>7.030</td>
<td>4.6%</td>
</tr>
<tr>
<td>5</td>
<td>376</td>
<td>302</td>
<td>1193286</td>
<td>54227</td>
<td>5.569</td>
<td>4.5%</td>
</tr>
<tr>
<td>6</td>
<td>374</td>
<td>300</td>
<td>1111043</td>
<td>52660</td>
<td>5.697</td>
<td>4.7%</td>
</tr>
<tr>
<td>7</td>
<td>366</td>
<td>286</td>
<td>1141294</td>
<td>53839</td>
<td>5.312</td>
<td>4.7%</td>
</tr>
<tr>
<td>8</td>
<td>361</td>
<td>211</td>
<td>1117165</td>
<td>50618</td>
<td>4.168</td>
<td>4.5%</td>
</tr>
<tr>
<td>9</td>
<td>358</td>
<td>223</td>
<td>1103247</td>
<td>49285</td>
<td>4.525</td>
<td>4.5%</td>
</tr>
<tr>
<td>10</td>
<td>349</td>
<td>216</td>
<td>1097094</td>
<td>50137</td>
<td>4.308</td>
<td>4.6%</td>
</tr>
<tr>
<td>11</td>
<td>337</td>
<td>199</td>
<td>1051891</td>
<td>47862</td>
<td>4.158</td>
<td>4.6%</td>
</tr>
<tr>
<td>12</td>
<td>333</td>
<td>186</td>
<td>1018566</td>
<td>47618</td>
<td>3.906</td>
<td>4.7%</td>
</tr>
<tr>
<td>13</td>
<td>216</td>
<td>104</td>
<td>624526</td>
<td>30538</td>
<td>3.406</td>
<td>4.9%</td>
</tr>
<tr>
<td>14</td>
<td>193</td>
<td>70</td>
<td>546357</td>
<td>26610</td>
<td>2.631</td>
<td>4.9%</td>
</tr>
</tbody>
</table>

CAUTI = catheter-associated urinary tract infection.
<sup>a</sup>404 nursing homes included in this analysis.
<sup>b</sup>CAUTI was defined using the Centers for Disease Control and Prevention’s National Healthcare Safety Network definition for long-term care.
<sup>c</sup>CAUTI rate = number of CAUTI per 1,000 indwelling urinary catheter-days.
### eTable 2. Multivariable-Regression Estimates of Changes in Catheter Use Rates

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Incidence Rate Ratio (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.95 (0.88-1.03)</td>
<td>0.26</td>
</tr>
<tr>
<td>Ownership</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For-profit</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>Not-for-profit</td>
<td>1.18 (1.00-1.38)</td>
<td>0.05</td>
</tr>
<tr>
<td>Part of a chain</td>
<td>0.92 (0.79-1.06)</td>
<td>0.26</td>
</tr>
<tr>
<td>Bed size&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.99 (0.98-1.00)</td>
<td>0.15</td>
</tr>
<tr>
<td>Provides sub-acute care</td>
<td>1.40 (1.03-1.91)</td>
<td>0.03</td>
</tr>
<tr>
<td>Overall 5 Star Rating</td>
<td>0.95 (0.89-1.01)</td>
<td>0.11</td>
</tr>
<tr>
<td>Infection preventionist has 3 or more years of experience</td>
<td>0.85 (0.72-0.99)</td>
<td>0.04</td>
</tr>
<tr>
<td>Presence of committee to review HAIs, including CAUTI</td>
<td>1.04 (0.87-1.25)</td>
<td>0.65</td>
</tr>
</tbody>
</table>

<sup>a</sup>36 nursing homes missing one or more demographic characteristics were excluded from the analysis.  
<sup>b</sup>Time was defined as the number of days from the end of the first reporting month to the end of the twelfth and final reporting month (335 days). Thus, the time variable was divided by 335 to give an incidence rate ratio representing change over the course of the project.  
<sup>c</sup>Bed size was calculated as the total number of beds divided by 10 so that the incidence rate ratio represents a 10 bed increase to make the respective incidence rate ratio and 95% CI more interpretable.